REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 337
GRAPHIC ARTS

INDEX

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MARICOPA COUNTY
AIR POLLUTION CONTROL REGULATIONS

REGULATION III - CONTROL OF AIR CONTAMINANTS

RULE 337
GRAPHIC ARTS

SECTION 100 - GENERAL

101 PURPOSE: To limit the emissions of volatile organic compounds to the ambient air from graphic arts operations and associated coating processes.

SECTION 200 - DEFINITIONS: For the purpose of this rule, the following definitions shall apply:

201 ALCOHOL - A volatile organic compound – such as isopropanol, normal-propanol, and ethanol – of alkane structure consisting of fewer than 6 carbon atoms and having a single OH- (hydroxyl) group and no other non-alkane attachments.

202 ALCOHOL SUBSTITUTE - A wetting agent, used to replace some or all of the alcohol in fountain solutions, and usually containing inorganic phosphates and volatile organic compounds such as glycols.

203 CIRCUITRY PRINTING - Any graphic arts operation which either uses ink(s) with specific electrical properties to print an electrical circuit, or prints a circuit pattern that is made into an electrical circuit through further processing.

204 CLEANING SOLUTION - Any liquid, including blanket wash and roller wash, used to remove ink and debris from the operating surfaces of a printing press or from any of the attached parts of a press.

205 COATING - A layer of material applied to a substrate in a relatively unbroken film.

206 EMISSION CONTROL SYSTEM (ECS) - A system for reducing emissions of organic compounds, consisting of both collection and control devices which are approved in writing by the Control Officer and are designed and operated in accordance with good engineering practice.

207 FLEXOGRAPHIC PRINTING - The application of words, designs or pictures by roll-printing technique in which the image-carrying surface is raised above the surface of the printing roll and the image carrier is made of flexible rubber or other elastomeric material.

208 GRAPHIC ARTS - All screen, gravure, letterpress, flexographic and lithographic printing processes, including related coating and laminating processes.

209 **GRAPHIC ARTS FACILITY -** All the graphic arts processes and activities which are located on one or more contiguous or adjacent properties and are under the control of the same person (or persons under common control).

210 **GRAPHIC ARTS MATERIAL -** Any ink, varnish, coating or adhesive, including added thinner or retarder, used in printing or related coating or laminating processes.

211 **GRAPHIC ARTS VARNISH -** A transparent material, applied by printing press, that is used to adjust gloss, to adjust color, or to protect printed material or printing substrate.

212 **GRAVURE PRINTING -** An intaglio process in which the ink is carried in minute, etched or engraved wells on a roll or cylinder, excess ink being removed from the surface by a doctor blade.

213 **LAMINATION -** A process of fusing two or more layers of material together to form a single sheet by using adhesive.

214 **LETTERPRESS PRINTING -** A method in which the image area is raised relative to the non-image area and the ink is transferred to the paper directly from the image surface.

215 **LITHOGRAPHIC PRINTING -** A printing process where the image and non-image areas of the printing plate are chemically differentiated; the image area is oil receptive and the non-image area is water receptive. This method differs from other printing methods, where the image is on a raised or recessed surface.

216 **NON-PRECURSOR ORGANIC COMPOUND -** Any of the organic compounds, listed in subsection a. of Appendix A, which have been designated by the EPA as having negligible photochemical reactivity.

217 **PRINTING -** An operation that imparts color, design, pattern, alphabet or numerals onto a substrate. It differs from coating in that its principal intent is to accomplish such visual/spatial outcome(s) rather than for other purposes commonly accomplished by using coatings.

218 **PRINTING INK -** A fluid or viscous formulation used in printing, impressing or transferring an image onto a substrate.

219 **SCREEN PRINTING -** A process of passing printing ink through a screen (a taut web or fabric) to make an imprint on a substrate. A refined form of stencil has been applied to the screen such that the stencil openings determine the form and dimensions of the imprint.

220 **UNITS PER PRINTING PRESS** - The number of printing surfaces per printing press.

221 **VAPOR PRESSURE -** The pressure exerted at a uniform temperature by the gas of a substance when the gas is in equilibrium with the liquid (or solid) phase of that substance. Example: At 68°F the vapor pressure of toluene vapor in equilibrium with undiluted liquid toluene is 23 millimeters of mercury.

222 **VOC VAPOR PRESSURE:** The total vapor pressure exerted by VOC at an even temperature. It distinguishes the vapor pressure of VOC from the vapor pressures of other fluids when a liquid contains both VOC and non-VOC fluids.

223 **VOLATILE ORGANIC COMPOUND (VOC) -** Any organic compound which participates in atmospheric photochemical reactions, except a non-precursor organic compound.

224 **WEB-FEED -** An automatic system which supplies substrate from a continuous roll or from a continuous extrusion process.

SECTION 300 - STANDARDS

301 **GRAPHIC ARTS MATERIALS:** VOC emissions from graphic arts materials shall be limited as follows:

301.1 **Limits of VOC Content:** No person shall apply any inks, varnishes, coatings, or adhesives unless the VOC content as applied is equal to or less than 2.5 pounds per gallon (300 grams per liter), less water and non-precursor organic compounds.

301.2 **Emission Control System for Offset Lithographic Printing:** As an alternative to the provisions of subsection 301.1, a person may comply by using an Emission Control System with a control device efficiency which reduces the VOC emissions from the dryer exhaust vent by at least 90 percent by weight. The dryer pressure shall be maintained lower than the press room air pressure such that air flows into the dryer at all times when the press is operating.

301.3 **Emission Control System for All Other Graphic Arts Printing:** As an alternative to the provisions of subsection 301.1, a person may comply by using an Emission Control System which reduces the VOC emissions from the dryer exhaust vent by at least 90 percent by weight, and an overall capture and control efficiency of at least 65 percent by weight.

302 **FOUNTAIN SOLUTION VOC LIMITS:** After March 27, 1997, an owner or operator of an offset lithographic printing press shall limit the combined total volume of alcohol, alcohol substitute, and any other VOC in each fountain solution source to the limits in column A of Table 1 whenever the press is on; except that a fountain solution source refrigerated below 60°F and having a properly indicating temperature monitor is subject to the limits in column B of Table I.

TABLE 1
VOC LIMITS BY VOLUME FOR FOUNTAIN SOLUTION *

Column A	Column B	Column C
	Limit for a Source Refrigerated	
General Limit	Below 60°F	Compliance Date
15 percent	25.5 percent	March 28, 1997
10 percent	17 percent	March 28, 1998
5 percent	8.5 percent	March 28, 1999

*(Appendix A Table AP-I gives equivalent limits)

303 CLEANING SOLUTIONS: Any person who owns or operates an offset lithographic printing press shall reduce VOC emissions from cleaning solutions by using cleaning solutions with a vapor pressure at 20°C compliant with the standards in Table 2. In addition, all VOC-containing materials used for cleaning and cleanup, including rags and towels, shall be stored in closed containers when not in use.

TABLE 2
VOC-VAPOR-PRESSURE LIMITS FOR CLEANING SOLUTIONS

Vapor Pressure	Compliance Date
33 mm Hg	March 28, 1997
25 mm Hg	March 28, 1998
10 mm Hg	March 28, 1999

304 LABELING REQUIREMENT: No person shall sell, offer for sale, or manufacture for sale within Maricopa County any ink, coating, adhesive, fountain solution or fountain solution concentrate for use in graphic arts operations unless such material includes a designation of VOC content on data sheet(s), expressed in pounds per gallon or grams per liter.

305 OPERATION AND MAINTENANCE (O&M) PLAN: The owners or operators of an emission control system used to meet the requirements of this rule shall provide the Control Officer with an O&M Plan. This plan shall specify key system operating parameters, such as temperatures, pressures and/or flow rates, necessary to determine compliance with this rule, and describe in detail procedures to maintain the emission control system. The Control Officer's written approval of this plan and the implementation of this plan shall be required for compliance with this section to be achieved.

306 EXEMPTIONS:

306.1 Exemption From Section 301: The provisions of Section 301 of this rule shall not apply to any graphic arts facility which emits less than the threshold amounts of 25 tons (22,680 kg) per calendar year and 4200 pounds (1909 kg) per month of VOC from all graphic arts and related coating operations prior to control. Except as otherwise directed by air pollution permit, any facility that becomes subject to the provisions of Section 301 by exceeding either threshold amount will remain subject to these provisions even if annual emissions later fall below these thresholds.

306.2 Total Exemption:

a. Circuitry printing is exempt from this rule. This exemption includes other associated printing performed for labeling, logo, or identification purposes on a printed circuit, its substrate, its immediate covering, or its immediate encapsulant by a circuitry printer.

b. Any printing operation in which no printing press has over two units, and the combined impression area of all presses together does not exceed 500 square inches (3226 cm^2) is exempt from this rule.

SECTION 400 - ADMINISTRATIVE REQUIREMENTS

401 EFFECTIVE DATE: This rule is effective May 3, 1996.

SECTION 500 - MONITORING AND RECORDS

501 PROVIDING AND MAINTAINING MONITORING DEVICES: Any person operating an Emission Control System pursuant to this rule shall install, maintain, and calibrate monitoring devices described in an O&M Plan. The monitoring devices shall measure temperatures, pressures, rates of flow, or other operating conditions necessary to determine if air pollution control equipment is functioning properly.

502 MONITORING FOUNTAIN SOLUTION CONTAINING ALCOHOL: The owner or operator of any printing press shall monitor the alcohol concentration of each fountain solution source containing any alcohol with a refractometer, a hydrometer or a conductivity meter. The instrument shall have a visual readout (analog or digital) with an accuracy of either ±2 percent of the meter's full scale, or ±0.5 percent absolute (such as for meter readings given in percent.)

502.1 Weekly Entry of Monitoring Data If Any Alcohol Is Used:

a. A weekly entry shall be made of the results of an instrument reading, required by Section 502, for each fountain solution source containing any alcohol; and

b. Weekly, for each fountain solution source, record the names and the most current mixing ratio of all alcohol, alcohol-substitutes, and water used in making fountain solution in that source.

502.2 Monthly Entries for Presses Which Never Use Any Alcohol: Monthly, record the names of all alcohol-substitutes and the mixing ratio of all alcohol-substitutes to water, for each fountain solution source on a press which never uses alcohol.

503 RECORDKEEPING AND REPORTING: Any person subject to this rule shall comply with the following requirements. Any records required by this rule shall be retained for five years and shall be made available to the Control Officer upon request.

503.1 Current List: Maintain a current list of inks, coatings, adhesives, fountain-solution alcohol(s) and alcohol substitutes, thinners, cleaners, and any other VOC-containing materials used at the facility; state the VOC content of each in pounds per gallon or grams per liter. In addition, for each blanket wash and other cleaning solution, list the VOC vapor pressure at 20°C (68°F).

503.2 Usage Records of Graphic Arts Materials and Cleaning Solutions: In compliance with the schedule in subsections 503.2 a. and 503.2 b. below, update records showing the type, and amount of each graphic-arts ink, varnish, coating, adhesive, fountain solution, blanket wash, and all other cleaning solutions.

a. Daily Records for 25 Ton Sources: Daily, an operator of a graphic arts facility shall update usage records of materials specified in subsection 503.2 if, facility-wide, such

facility emits 25 tons or more of VOC emissions per calendar year or 4200 pounds or more of VOC emissions per month from all graphic arts and related coating operations prior to any control. However, the operator may maintain *monthly* records of materials complying with subsection 301.1 VOC limits or Section 303 vapor pressure limits, if each material served by a control device is identified as such.

b. Monthly Usage Records: Monthly records of materials' usage shall be maintained pursuant to subsection 503.2 by any facility except for the (≥25 TPY) facilities subject to subsection 503.2 a..

503.3 ECS Operation and Maintenance: Maintain a continuous record of the times an Emission Control Device is used to comply with this rule. Maintain daily records of the O&M Plan's key system operating parameters. Maintain records of all maintenance performed according to the O&M Plan.

504 COMPLIANCE DETERMINATION - TEST METHODS

504.1 Sample Analysis: VOC content of graphic arts materials regulated by Section 301 or Section 302 shall be determined using the applicable EPA Reference Method 24 or 24A, Title 40, CFR, Part 60, Appendix A. Calculation of the VOC content of fountain solutions (reference Section 302) shall place the entire volume of the sample in the denominator, e.g., including water, alcohol, non-precursors, and all other solutes, such that the entire volume of the sample is included in the calculations.

504.2 Test Method For Determining Minimum VOC Content Of A Fountain Solution Via Density And Specific Gravity: The test method procedure, which employs an ASTM-rated hydrometer, is found in this rule's Appendix A, subsection b. ASTM is the American Society for Testing and Materials.

504.3 Emission Testing: Control efficiency of an emissions control device shall be determined according to EPA Reference Method 25, 25A, or 25B, Title 40, CFR Part 60, Appendix A. Capture efficiency of an Emissions Control System shall be determined according to "Guidelines for Determining Capture Efficiency" January 9, 1995, Candace Sorrell, Source Characterization Group A, Office of Air Quality Planning and Standards, US EPA. This document is incorporated by reference and is available at 2406 South 24 Street, Suite E-214, Phoenix, Arizona, or call (602)-506-6700 for information.

504.4 Vapor Pressure: The total partial vapor pressure of all VOC in a cleaning solution shall be determined by ASTM D2879-92 or by calculations using certified data from a laboratory or manufacturer revealing the exact formulation.

APPENDIX A TO RULE 337

a. Definition.

NON-PRECURSOR ORGANIC COMPOUND - Any of the following organic compounds which have been designated by the EPA as having negligible photochemical reactivity: acetone; methane; ethane; methylene

chloride (dichloromethane); 1,1,1-trichloroethane; trichlorofluoromethane (CFC-11); dichlorodifluoromethane (CFC-12); chlorodifluoromethane (CFC-22); 1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113); 1,2-dichlorotetrafluoroethane (CFC-114); chloropentafluoroethane (CFC-115); trifluoromethane (HFC-23); 2,2-dichloro-1,1,1-trifluoroethane (HCFC-123); 2-chloro-1,1,1,2-tetrafluoroethane (HCFC-124); 1,1-dichloro-1-fluoroethane (HCFC-141b); 1-chloro-1,1-difluoroethane (HCFC-142b); pentafluoroethane (HFC-125); 1,1,2,2-tetrafluoroethane (HFC-134); 1,1,1,2-tetrafluoroethane (HFC-134a); 1,1,1-trifluoroethane (HFC-143a); 1,1-difluoroethane (HFC-152a); parachlorobenzotrifluoride (PCBTF); perchloroethylene (tetrachloroethylene); 3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca); 1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb); 1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC 43-10mee); cyclic, branched, or linear completely methylated siloxanes; all completely fluorinated, completely saturated: alkanes, ethers and tertiary amines; sulfur-containing perfluorocarbons with no unsaturations, no hydrogen, and with sulfur bonds only to carbon and fluorine.

b. Test Method for Determining the Density and Specific Gravity of a Fountain Solution:

(1) Procedure: Gently invert or shake a covered container of fluid to be tested several times to assure adequate mixing. No foam should be present where hydrometers are inserted. Readings should be taken as quickly as is practicable to avoid unnecessary evaporation of VOC content. Conduct 6 successive readings with 2 different hydrometers, 3 readings apiece. Each hydrometer shall be accurate within 2 percent of full scale and conform to ASTM requirements. A thermometer, accurate to $\pm 0.5°F$ and conforming to ASTM requirements, shall be used and the temperature of the fountain solution being tested shall be noted. The thermometer may be an integral part of a combined form hydrometer. The density of water at that temperature shall be obtained from a standard table such as is found in the CRC reference.

(2) Findings: The quotient of the density of the fluid divided by the density of water shall be determined for each of the 6 pairs of numbers. If none of the 6 results equals or exceeds (is larger than) the applicable specific gravity limit in Table AP-1, then the percent of VOC in the tested fountain solution exceeds the limit. In other words, it is not a violation of the limit unless each of the total of six results is below the limit.

c. Equivalent Expressions of VOC Limit:

Table AP-I*

VOC LIMIT (by volume)	Limit: Maximum pounds of VOC per gallon of fountain solution	Limit: Metric equivalent	Specific Gravity of IPA & water at VOC volume limit
15%	1.1 lb/gal	130 g/liter	0.9800
10%	0.75 lb/gal	90 g/liter	0.9860
5%	0.43 lb/gal	52 g/liter	0.9920
25.5%	1.75 lb/gal	210 g/liter	0.9690
17%	1.16 lb/gal	140 g/liter	0.9790
8.5%	0.58 lb/gal	70 g/liter	0.9890

*(This table references Table 1, Section 302)

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